The Influence of Genetic Information and Crime-Type on Juror Decision Making

Bethany R. Muir

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Statement of Sources

I declare that this report is my own original work and that contributions of others have been duly acknowledged.

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Table of Contents

List of Tables

List of Figures

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Abstract

The Monoamine Oxidase A (MAOA) gene, paired with a traumatic childhood background, can predispose an individual to behave impulsively and aggressively. Defence lawyers see this genetic link as a way to reduce a defendant's sentence. This study endeavoured to establish whether mock jurors see this evidence as grounds for reducing a sentence, or, as the literature indicates, likely to increase it, on the basis of dangerousness. The influence of genetic evidence on crime-type differences (i.e., assault compared to bank fraud) was also investigated. A total of 217 participants (148 females) between 18–75 years of age (M = 31.35, SD = 14.18) were randomly allocated to one of four conditions detailing a crime (white-collar or blue-collar) and additional expert evidence regarding the possession of the MAOA gene (with a control group). Participants, acting as mock jurors, completed questions regarding judgements of the defendant's level of culpability, level of dangerousness, and how severe the sentence should be. Findings demonstrated that mock jurors who received additional genetic evidence viewed the defendant as less culpable for the crime and more dangerous, but overall, provided a less harsh sentence than those who were not presented with such evidence. Crime-type differences were found only for perceptions of dangerousness, showing that blue-collar criminals with the MAOA gene were seen as more dangerous than white-collar criminals with the gene. These findings suggest that while perceptions of dangerousness are heightened, jurors believe a mitigated sentence is warranted for a defendant who possesses the MAOA gene. This has implications for defence lawyers who can utilise this form of evidence to mitigate their defendants' sentences.

Genes play an influential role in human characteristics and behaviour (Scurich & Appelbaum, 2017). The effect of some genes (i.e., genes that determine our appearance) are more obvious and influential than others. Other genes can remain unknown or hidden to the individual and the rest of the world for a number of years, until an event occurs which brings the gene into play. Lombroso (1876, as cited in Baum, 2013) was the first to theorise that some individuals are born to be criminals. While his ideas were broadly rejected, this was the foundation of the idea that biological characteristics - including an individual's genotype - may influence behaviour. While it is now the general consensus that genetics and environment play an interacting role in influencing human behaviour, how we use that information - specifically in relation to forensic decisions - is the subject of current discussion.

Of particular relevance for forensic decisions is the Monoamine Oxidase A (MAOA) gene. MAOA can predispose an individual to behave more impulsive and aggressive in their adulthood, however it has been demonstrated that this only occurs when coupled with the presence of serious childhood trauma (Caspi et al., 2002). This link between the MAOA gene and aggressive behaviour has led to its controversial introduction as a form of evidence in courtroom trials (Appelbaum, 2005), raising the question: 'Should genetic information be presented in court as a form of mitigating evidence?'

While a small number of cases (predominantly from the USA) have successfully implemented this evidence which has resulted in lesser sentences (e.g., McSwiggan, Elger, & Appelbaum, 2017), empirical research has not found strong evidence of judges or jurors considering this information as mitigating. Instead, research has demonstrated mixed effects, with some showing mitigating effects (e.g., reduced perception of culpability; Fuss, Dressing, & Briken, 2015), some showing

aggravating effects (e.g., harsher sentencing decisions; Lui, Reiter, Barry, & Robinson, 2019), and others showing that the evidence neither mitigates nor aggravates sentences (Appelbaum & Scurich, 2014). These inconsistent results demonstrate the need for further research to determine whether there is an effect of genetic information in juror decision making and whether this effect is mitigating, aggravating, or a balance of both.

Furthermore, investigation into whether this information differs depending on the type of crime is warranted as this has been neglected in previous literature. Such information may provide understanding into decision making in courtrooms in order to inform lawyers as to whether introducing this type of evidence would be a viable defence strategy. To understand this issue, further research into the effect of behavioural genetic evidence is needed.

The MAOA Gene

The MAOA gene has recently gained attention as an example of a single gene influencing a person's susceptibility to aggression and violence. This effect was first described by research into a Dutch family's genetics, which found that men who demonstrated unusually high impulsive, aggressive, and antisocial behaviour, also possessed a rare mutation on the X chromosome that resulted in the absence of the MAOA enzyme (Brunner, Nelen, Breakefield, Ropers, & van Oost, 1993). While a complete absence of MAOA expression is rare, there are two main variants (known as alleles) of the MAOA gene – low and high – which differ in level of expression and associated neurotransmitter levels, such as serotonin and dopamine (González-Tapia & Obsuth, 2015). The low variant (MAOA-L) is associated with reduced production of serotonin and other neurotransmitters that inhibit impulsive and aggressive behaviour, leading to a behavioural predisposition to aggression and

violence. Reduced levels of serotonin, in particular, has been demonstrated to be associated with violence (Moore, Scarpa, & Raine, 2002), and indeed, the men in Brunner et al.'s study demonstrated aggressive behaviour.

Although the impact of MAOA-L possession is not substantial in isolation, there is compelling evidence that it exerts a sizable effect when paired with hostile environmental stimuli. This was demonstrated in Caspi et al.'s (2002) longitudinal study of male children, involving measures of antisocial behaviour up until 26 years years of age. It was found that 85% of children who had been maltreated and possessed a low level of MAOA showed some form of impulsive and antisocial behaviour in their adult years. However those with the low MAOA genotype that had not been maltreated showed significantly less antisocial behaviour. Individuals who endured childhood maltreatment with a genotype consisting of high levels of the MAOA genotype were also significantly less likely to develop this violent predisposition (Caspi et al., 2002). This suggests that possessing only low levels of the MAOA gene, combined with childhood maltreatment, increased the chances of impulsive and violent behaviour. Since Caspi et al.'s findings, a number of studies have supported this relationship (e.g., Klasen et al., 2018; Taylor & Kim-Cohen, 2007).

Courtroom Application of the MAOA Gene

The discovery of the MAOA-L gene's influence on human behaviour raises potential for lawyers to argue that defendant sentences should be reduced, on the basis that the gene reduces voluntary control (Appelbaum, 2005). This type of evidence has typically been introduced during the sentencing stage – whereby the court looks at factors that mitigate (i.e., reduce) or aggravate (i.e., increase) the sentence (O'Mahony & de Paor, 2017). The first case to use MAOA-L as an attempt

to mitigate a sentence was *Mobley v. State* (1995), which, although unsuccessful, was the beginning of the consideration of this information as a form of evidence. Since then a number of criminal cases have attempted to implement this evidence, with mixed success. Analysis of the 33 criminal cases that have implemented behavioural genetic evidence between 2007–2011 showed that in all cases, genetic information was always considered and no court completely rejected the introduction of the evidence (Denno, 2011). This suggests that genetic information has merit in its use as a form of evidence. As for the impact the evidence had on the courts, this was varied and case dependent. A number of cases (e.g., *Brant v. State,* 2009; *Creech v. Hardison,* 2010) stated that although genetic evidence was considered as mitigating evidence, it was not strong enough to outweigh the aggravating evidence (e.g., premeditation of the crime; nature of the crime; Denno, 2011). Another review, of 11 cases between 1995–2016, found that behavioural genetic evidence appeared to be successful in mitigating moral culpability, but did not completely excuse an accused from full criminal responsibility (McSwiggan et al., 2017).

Other cases have given behavioural genetics more weight, resulting in sentences being mitigated. An example of a successful case is *State v. Waldroup* (2011). Spurred by a domestic dispute, Waldroup violently killed his wife's friend and attempted to kill his own wife with a machete. Whilst assessing Waldroup, the forensic psychiatrist discovered that he possessed a variant gene with a deficiency of MAOA. The psychiatrist testified that this deficiency, added to Waldroup's history of childhood maltreatment, predisposed him to violent behaviour. This gene-environmental evidence led the jury to charge him with voluntary manslaughter rather than murder, preventing him from receiving the death penalty (Denno, 2011).

Overall, the court case findings suggest that while behavioural genetic evidence is not rejected as a form of evidence, its mitigating potency may be too weak. As a result, the evidence may not lead to reduced sentences, especially if outweighed by aggravating evidence. Nevertheless, the use of genetic evidence has resulted in successful mitigation.

Empirical Evidence

Mitigating effects in empirical evidence.

One of the first studies to investigate the impact of genetic evidence in the legal context looked at 181 judges' responses as to whether or not genetic information (that indicated psychopathy) mitigated or aggravated outcomes in a hypothetical defence case (Aspinwall, Brown, & Tabery, 2012). Participants were presented with the same vignette detailing an aggravated battery court case. Participants were randomly assigned to one of two presenting party conditions (i.e., the evidence was presented as mitigating by the defence, or aggravating by the prosecution), and one of two biomechanism conditions (i.e., expert testimony diagnosing him only of psychopathy, or expert testimony diagnosing him with psychopathy as well as an explanation of how the MAOA gene contributed to this). While overall the psychopathy evidence was perceived to be aggravating, the presentation of additional biomechanism information resulted in lower sentences (average 12.83 years) compared to no additional information (average 13.93 years). This suggests that introducing information about the MAOA gene and underlying biological causes of defendant behaviour can have mitigating results.

In an attempt to replicate Aspinwall et al.'s (2012) findings, a study involving German judges was conducted, following the same methodology (Fuss et al., 2015). Fuss et al. found that while Aspinwall et al. demonstrated that the majority of U.S.

judges saw the evidence as aggravating overall, the majority of German judges found the evidence as mitigating overall. The presentation of additional biomechanism information resulted in lower perceived legal responsibility, especially when presented by the defence, however this did not impact sentence length. There were, however, increased responses of involuntary commitment to a psychiatric hospital when the evidence was presented by the prosecution. In other words, judges saw this evidence as an indication of the defendant being more dangerous, and suggested a rehabilitative approach. These results are in contrast with Aspinwall et al.'s study, possibly because judges in their study were told rehabilitation was not an option. It is also possible that differences between these studies may be due to jurisdiction or cultural differences (McSwiggan et al., 2017) – aspects that have also been speculated upon in other research (e.g., Cheung & Heine, 2015).

Similar studies have attempted to replicate these findings in jury samples. Lui et al. (2019) investigated whether different causal accounts of psychopathy (genetic or environmental) influenced perceptions of the offender. They presented undergraduate students (potential jurors) with one of five conditions which manipulated sex of the offender and the aetiology of the psychopathy diagnosis. Participants were asked a number of questions regarding culpability, recidivism, amenability to change, and sentence severity. Consistent with previously mentioned studies, genetic explanations resulted in views of less culpability, but in this case, increased sentence severity. Lui et al.'s study was limited in its exclusive use of undergraduate students, who generally make up only a small representation of eligible jurors.

Aggravating empirical evidence.

Judges and jurors may feel inclined to administer harsher penalties for defendants who pose a threat to society and who are more likely to commit crimes again in the future if released (Padayatty & Chandra, 2009). Genetic explanations may elicit increased fear of a defendant through implying that they lack control of behaviour, and cannot be cured or rehabilitated (Berryessa, 2014). Appelbaum, Scurich, and Raad (2015) presented three different legal cases to a representative sample of the U.S. population (N = 960), with different variations of additional evidence presented (e.g., regarding the possession of a violence-prone gene) and asked participants several questions regarding their perceptions of the defendant, and sentencing suggestions. Participants were shown three legal cases: A description of a murder and asked to determine sentence length; the description of a kidnapping and murder and asked to consider whether the defendant should be found guilty by insanity; and a capital murder case and asked whether the defendant should receive either the death penalty or life in jail. Results showed that there was no significant effect (neither mitigating nor aggravating) of genetic evidence on the severity of punishment given. This was consistent with their pilot study (Appelbaum & Scurich, 2014), which otherwise found that although participants were more apprehensive and fearful of gene-predisposed defendants, there was no effect on sentence severity.

This effect was also found in Costa, Pate, and Gibson's (2017) study. In particular, the researchers found that while there was no influence on sentencing decisions, combining a genetic predisposition with an environmental explanation (i.e., childhood abuse) resulted in greater apprehensiveness, as this suggested that the defendant had even less control over their behaviour. This finding demonstrates the double-edged sword nature of behavioural genetic evidence, resulting in a balancing

act between the heightened apprehensiveness of the defendant, but also the recognition that their actions were out of their control, thus assigning less culpability (Dar-Nimrod & Heine, 2011). A noted ecological limitation in these studies is the fact that jurors are not always involved in sentencing decisions. In the USA and a number of other jurisdictions, jurors may only be involved in capital punishment sentencing, deciding whether or not the defendant should be sentenced to death (Appelbaum et al., 2015). Nevertheless, it is still important for research to explore this impact of genetic information on public attitudes, regardless of whether or not they recommend sentencing.

Empirical evidence and noncapital crimes.

While the majority of researchers have opted to study the effects of genetic information on death penalty cases, there are a small number of studies that looked at the influence of genetic evidence on noncapital crimes. Scurich and Appelbaum (2015), for example, asked 640 members of the general population to consider three events that involved lesser offences (i.e., an assault with a deadly weapon; a college student who broke a window; and a misbehaving eight-year old at home). Participants were randomly assigned to different explanations of behaviour, such as genetics or an abusive childhood. Across the three cases, the effect of genetic explanations was not found to differ depending on severity of offenses, nor if the crime was nonviolent. The researchers concluded that in contrast with the common assumption that people may hold genetic determinism beliefs (i.e., genetics predominantly control all human behaviour), it appears that the general public consider genes to have little impact on behaviour (Scurich & Appelbaum, 2015).

Robbins and Litton (2018) also investigated the impact of crime severity and inclusion of genetic evidence. To do this, they presented one of two vignettes to

participants (a robbery or a homicide) committed by a defendant with a brain disorder. Randomly allocated explanations of how the defendant received his brain disorder were then provided; either genetic (e.g., possession of MAOA gene), environmental (e.g., childhood abuse) or accidental. They found a small significant effect of crime-type on blame and punishment (more blame and severe sentencing allocated to homicide than robbery). While it is unsurprising that more severe sentences would be conferred for a murder (compared to robbery), it is interesting that blameworthiness also increased, suggesting that crime-type may have an influence on perceived culpability. Robbins and Litton's study also found that defendants were perceived as more blameworthy and more deserving of punishment when the aetiology of the brain/mental disorder was genetic rather than environmental. In other words, offenders who have a genetically caused brain impairment (i.e., MAOA gene) are likely to be judged more negatively than offenders who have an environmentally caused impairment (i.e., childhood abuse).

Robbins and Litton (2018) suggest that this result is consistent with the theory of dyadic morality (Gray & Wegner, 2011) – which suggests that people make judgments about situations (including criminal acts) through their perception of individuals being moral agents (i.e., having the capacity to perform actions) or moral patients (i.e., being on the receiving end of actions or experiencing events out of their control). The theory suggests that if an offender is perceived as a victim of harm then they are seen to be less blameworthy or culpable for an action. As Robbins and Litton's study exhibited, a person who experienced childhood trauma is seen as a victim of harm, and thus, less culpable for a crime. A possible limitation for this study may be that some scenarios implied that the cause was a brain injury. This has implications of being a confound, as participants may have perceived the defendant

as having diminished responsibility due to injury alone, rather than the genetic or environmental explanations. The study also heavily focused on brain structure while explaining the offender's behaviour which might have added a layer of complexity and may have confused participants. It should also be noted that there was no interaction between crime-type and aetiology of injury.

Summary of empirical evidence.

The empirical research suggests that behavioural genetic evidence has the potential to either be mitigating, aggravating, or have no direct effect. There are a range of possibilities as to why this may be the case. The nature of the genetic information is such that on one hand it reduces blameworthiness of the defendant's behaviour, but on the other hand, it increases the likelihood of similar acts of aggression to occur (Scurich & Appelbaum, 2017). This double-edged sword has been demonstrated in a number of studies whereby genetic evidence functioned as both a mitigating and aggravating factor (e.g., Fuss et al., 2015; Lui et al., 2019). As stated by a judge in Aspinwall et al.'s (2012, p. 848) study: "Psychopathy may make the defendant less morally culpable, but it increases his future dangerousness to society. In my mind, these factors balance out". This epitomises the majority of findings in research – while perceptions of culpability may decrease, sentence severity ratings were either unaffected (Appelbaum & Scurich, 2014; Appelbaum et al., 2015; Costa et al., 2017) or aggravated (Fuss et al., 2015; Lui et al., 2019), rather than mitigated. It should be noted that a number of studies who found aggravated sentences used psychopathy as their genetic predisposition, something which has stigma attached to it, which may account for the harsher sentencing (Aspinwall et al., 2012; Lui et al., 2019). There is also the possibility that jurors may just not view genes as a major determinant in behaviour (cf. genetic determinism approach – see

Tabb, Lebowitz, & Appelbaum, 2018), and so behavioural genetic evidence simply does not sanction for an excuse for reducing culpability or severity of sentences (Scurich & Appelbaum, 2017).

Type of Crime

As previously discussed, genetic evidence, including the MAOA-L gene, has most commonly been associated with and used as evidence in homicide trials (Denno, 2011). As discussed by Levitt and Manson (2007), it is plausible that the MAOA-L gene could be associated with nonviolent crimes should they be impulsive in nature, given that the interaction between MAOA-L and childhood trauma is associated with poor impulse control. Thus it is the impulsiveness, not necessarily the severity of the crime, which is important to consider when MAOA-L is used as evidence. For example, consider a person with the MAOA-L gene who has just committed a murder, that was planned for weeks and executed calmly when the time was right. While this crime is certainly violent, and there is a link between the gene deficiency and violence, it is unlikely that this defence is justified given that the evidence showed the defendant had full control over his actions. In comparison, take the example of a bank clerk who was rejected for a promotion, and, in a fit of uncontrollable rage, transfers funds from other accounts into his own. In this case, even though it is a white-collar and nonviolent crime, the MAOA-L defence would be more relevant and applicable than the murder example, as it could be argued that the highly impulsive response in this crime could be attributed to the effects of the MAOA-L gene. As such, it is important to consider the various types of crime where MAOA-L could be used as evidence, rather than focusing solely on violent, blue-collar criminal activity.

While blue-collar crime (or street crime) dominates crime-type research, the investigation of factors influencing white-collar crime sentencing is limited (Cassidy & Gibbons, 2019). There has been public speculation that white-collar crime is treated more leniently than blue-collar crime (Allen & Berg, 2016; Butler, 2012; Comino, 2018; Henning, 2013). Since white-collar crimes are dubbed as victimless crimes, perceptions of the seriousness of the crime can be reduced, as demonstrated through Rossi, Waite, Bose, and Berk's (1974) study, where the general public ranked these crimes as low in seriousness compared to crimes against persons (e.g., assault). In a more recent study, Michel (2016) presented members of the general public with vignettes describing violent street crimes and physically harmful white-collar crimes (e.g., failed safety protocols) and asked them to compare their seriousness and to suggest appropriate punishments. Similar to Rossi et al.'s study, white-collar crimes were perceived as less serious and resulted in less punitive ratings than blue-collar crimes. Michel speculated that the public may automatically associate white-collar crime with just financial loss rather than physical harm, and that the latter is perceived to be more punishable. As a former police officer stated, "[white-collar crimes] are not taken as seriously as other crimes because they're not violent" (Brandolph, 2014, para. 17).

Focal Concerns Theory

The focal concerns model of sentencing suggests that sentencing decisions are influenced by three aspects: Blameworthiness, protection of community, and practical constraints and consequences (Steffensmeier, Ulmer, & Kramer, 2006). Blameworthiness is based on the idea that punishment increases depending on the offender's culpability and degree of harm caused. Protection of the community focuses on the need to deter offenders in order to protect society from any future

harm. Practical constraints and consequences consider the offender's ability to serve the time in jail (e.g., special needs, costs). When assessing these focal concerns, decision makers consider a number of factors. These factors can be legal (case-level information such as prior records and offence types), or extralegal (individual-level information such as age, race and gender; Steffensmeier, Painter-David, & Ulmer, 2017). Empirical evidence into extralegal factors on white-collar crime sentencing has primarily focused on age (Holtfreter, 2013), gender (Van Slyke & Bales, 2013), and race (Hagan & Nagel, 1982). These legal and extralegal factors can impact the perception of defendant characteristics. Defendants who possess traits that are stereotypically defined as blameworthy and dangerous are expected to receive more severe punishments (Ray & Dollar, 2013). For example, if considering the role of race, the focal concerns theory predicts that racial stereotypes associated with particular crimes may play a role in sentencing decisions by influencing perceptions of offender blameworthiness and dangerousness (Cassidy & Gibbs, 2019).

This prediction has been borne out in a number of studies. For example, there is an assumption that there is an association between white defendants and white-collar crimes, and black defendants and blue-collar crimes, likely due to stereotypes (Gordon, Bindrim, McNicholas, & Walden, 1988). In terms of sentencing decisions, when the defendant's race is perceived as being typical of committing a specific type of crime (e.g., black defendants and blue-collar crime), this will lead to harsher sentences. Contrastingly, if the race is not typical of the crime, and not in line with internal stereotypes (e.g., black defendants and white-collar crime), then this will result in lenient sentences (Cassidy & Gibbs, 2019). While race is not a focus of this study, this pattern may be clear in other information that can be stereotyped. It can be assumed that the possession of the MAOA-L gene (i.e., being predisposed to

impulsivity and aggressiveness) is likely to be stereotypical of a blue-collar crime as opposed to a white-collar crime, because the former is typically associated with violent connotations compared to the latter.

Present Study

The review of the literature demonstrates that findings regarding the impact of genetic evidence on juror decision making is mixed, and there are a number of limitations. The majority of studies have been conducted in the USA, which is one of the few remaining countries to enforce capital punishment which consequently may have effects on juror sentencing judgments. Furthermore, cultural effects may be present, as demonstrated through differences between German (Fuss et al., 2015) and U.S. studies (Aspinwall et al., 2012). Studies have also neglected to consider white-collar crimes, and have provided additional forensic evidence (such as neuroimaging or diagnosis of psychopathy) which may further influence results. The current study aims to address these limitations through evaluating Australian mock juror perspectives on their interpretation of a defendant possessing the MAOA-L gene, and whether these perspectives differ if presented with a white-collar crime or a blue-collar crime.

Despite mixed findings to date, it appears there is a general consensus that genetic evidence reduces culpability, but can aggravate, or not have an effect on, the sentencing. The overarching aim of this study is to investigate the influence of genetic information on mock juror decisions, and whether this differs between the type of crime. Within this, the study also aims to provide details of factors that may influence these decisions, such as sympathy. The review of the literature has led to the formulation of the following hypotheses:

- Participants will perceive the defendant as less culpable for the crime when a genetic explanation is presented, compared to those who do not receive additional evidence.
- Participants will perceive the defendant as more dangerous when a genetic explanation is presented, compared to those who do not receive additional evidence.
- Participants will recommend more severe sentencing when a genetic explanation is presented, compared to those who do not receive additional evidence.

The focal concerns theory provides for prediction of the interaction between crime type (i.e., white-collar or blue-collar) and genetic information (i.e., MAOA gene or no gene), through the assumption that blue-collar crime will be stereotypically associated with the gene, likely leading to higher ratings of culpability (blameworthiness) and perceived dangerousness (i.e., to protect the community) of the defendant. As a result, this should also increase sentence severity. Because white-collar crime may not stereotypically be associated with the gene, this should lead to lower ratings of defendant culpability, a higher perceived dangerousness of the defendant, and decreased sentence severity. The understanding and review of this theory has led to the development of the following hypotheses:

- The presence of the genetic information will result in higher ratings of perceived culpability in the blue-collar crime condition than the white-collar crime condition.
- The presence of the genetic information will result in higher ratings of perceived dangerousness of the defendant in the blue-collar crime condition than the white-collar crime condition.

- The presence of the genetic information will result in more severe sentences in the blue-collar crime condition than the white-collar crime condition.

Method

Design

Ethical approval for this study was obtained from the Tasmanian Social Sciences Human Research Ethics Committee (ethics reference number: H0018144, Appendix A). This study implemented a between-groups factorial design, with two independent variables: MAOA-L gene information (present vs. absent) and type of crime (white-collar vs. blue-collar), which were manipulated through vignette presentation. The dependent variables were culpability, perceived dangerousness, and sentence severity, which were measured through a number of questions. As part of requirement for a separate study, participants read a second vignette and completed similar questions – order effects were considered and studies were counterbalanced.

Participants

A total of 217 people, compromising of first-year psychology students and members of the general public, were included in the final analysis. Only participants that were 18 years of age or older were eligible to take the survey and only complete survey data were eligible for analysis. Table 1 provides participant demographic information. Participants were recruited through means such as flyers (Appendix B), social media (Facebook; Appendix C), and SONA (for first-year UTAS psychology students). First-year psychology students were able to receive 45 minutes of course credit after participation and the general public had the option to go into a draw to win a $50 gift voucher. An *a priori g*power* analysis determined that at least 160

participants would be required for a medium effect, with at least 40 participants per condition.

Table 1

Participant Demographic Information

Characteristics	*N* (Total = 217)
Age	
Mean (SD)	31.35(14.18)
Gender	
Male	68
Female	148
Prefer not to say	1
Ethnicity	
Caucasian	196
Aboriginal/Torres Strait Islander	4
Asian	13
Samoan	1
Pakistanian	1
Caucasian/Asian	2
Previously enrolled units	
University level neuroscience units (including PSY101 and KHA106)	64
University level law units	28

Materials

Demographic and academic background. Participants were asked to provide their age (a drop-down box from 18 to 75+ years), gender, ethnicity, and whether they currently or previously were enrolled in KHA106 or PSY112, any university level law units, or neuroscience units (Appendix D).

Vignettes. Participants were presented with a description of either a white-collar or blue-collar crime, which was modified to have either genetic evidence included or not, resulting in four vignettes. The white-collar crime vignette described an alleged fraud that the defendant Michael had committed as a result of not receiving a promotion. In the second vignette, a blue-collar crime is described, containing details of an alleged assault, with the defendant Michael accused of assaulting a parking officer for giving him a ticket. Each vignette was 120 words long and matched in terms of level of detail of the crime. Additional information was added to manipulate the genetic information conditions. This information involved Michael's defence lawyer demonstrating that Michael possessed the MAOA-L gene, with an expert witness testifying that this gene is associated with impulsive behaviour when childhood trauma is experienced. It was also demonstrated that Michael experienced such trauma. Participants in the control group did not receive any additional information. See Appendix E for full descriptions of each vignette.

Comprehension check. A comprehension check required participants to identify what crime Michael was charged with. For white-collar crime vignettes, the options were 'financial fraud' and 'bank robbery'. For blue-collar crime vignettes, the options were 'attempted murder' or 'common assault'.

Perceptions of culpability. Four items were used to measure culpability. Participants were asked to indicate on a 5-point Likert scale (1 – strongly disagree, 5

– strongly agree) of whether Michael should be found guilty of the crime. The question '*Michael was legally responsible for the crime'* was adapted from Aspinwall et al.'s (2012) study, and '*Michael was in control of his actions'* was adapted from Scurich and Appelbaum's study (2015). The fourth item was *'The impulsive nature of the crime means Michael is less responsible for his actions'*. Participants were asked to indicate their level of agreement to these questions on a 5-point Likert scale (1 – strongly disagree, 5 – strongly agree). These four items were totalled together to form a total culpability score. Additional questions were asked for those who were presented with genetic information (see Appendix F for all survey questions).

Perceptions of dangerousness. Three items were used to measure perceptions of dangerousness. The question *'I would be fearful of Michael if I met him'* was adapted from Scurich and Appelbaum's (2015) study. *'Michael is a danger to society'* was also asked. These questions were asked to rate their level of agreement on a 5-point Likert scale (1 – strongly disagree, 5 – strongly agree). The question '*How likely do you think it is that Michael will engage in a similar criminal act in the future*' was adapted from Lui et al. (2019) and asked participants to rate on a 5-point Likert scale (1 – very unlikely, 5 – very likely). These three items were totalled together to form a total perception of dangerousness score. Three additional questions were asked for the genetic information condition (Appendix F). One question was asked to measure levels of sympathy (*'I feel sympathy for Michael'*). This question was adapted from Scurich and Appelbaum's (2015) study in order to investigate whether sympathy played a role in sentencing decisions.

Sentence severity. Six questions were used to measure sentence severity. Participants were asked to choose a type of punishment for Michael (good behaviour

bond, imprisonment, fine or no punishment), and provided with a drop-down box to indicate how many years Michael should be imprisoned for (0 – 50+ years). Participants were also asked to indicate on a sliding scale of 1 (not at all serious) to 10 (very serious) how serious a crime assault/fraud is. In addition, participants were asked to indicate whether Michael's sentence should be shorter or longer than the average length of four years (1 – shorter than average, 5 – a lot longer than average). The statements *'Michael should be punished less harshly because of the impulsive nature of the crime'* and *'I believe Michael is capable of rehabilitation'* were also presented to all participants (1 – strongly disagree, 5 – strongly agree). All six items remained separate in analyses. Additional questions were presented to those in the genetic information condition (Appendix F).

Public Understanding and Attitudes towards Genetics and Genomics Scale (PUGGS; Carver, Castéra, Gericke, Evangelista, & El-Hani, 2017). Two sections (section 2 and 3) of the PUGGS were used to measure participants' general genetic knowledge (Appendix G). Section 2 of the PUGGS focuses on participant beliefs in genetic determinism. It includes 16 items of traits and asks participants to consider whether these traits are influenced by the environment or by genetics. Section 3 required 'true/false/don't know' responses to nine statements on knowledge regarding gene-environment interaction. Correct scores in these sections indicate greater knowledge about genetics. These questions were used to determine what participants' average level of genetic knowledge was. If there was a significant difference between groups, then this would be used as a covariate in data analyses. The PUGGS has been shown to be a reliable and valid questionnaire (Cronbach's alpha = 0.67; Carver et al., 2017).

Procedure

All participants completed the study online and were randomly allocated to one of four conditions through SurveyMonkey. Participants were first presented with an information sheet (Appendix H) and asked to click 'agree' as form of consent (Appendix I). Upon consent, participants were randomly allocated to one of the four conditions, and demographic and academic history information was obtained. Participants were then presented with one of four vignettes (Appendix E), followed by a comprehension check question. The dependent variable questions regarding sentence severity, culpability, and perceptions of dangerousness were then presented. Lastly, participants completed the PUGGS questionnaire (section 2 and 3). On completion of the survey, participants were thanked for their time and given the option to either receive credit (for psychology first-year students) or to go in a draw to obtain a $50.00 gift voucher (completed via a separate link to allow data to remain de-identified).

Data Analysis

Multiple 2 (genetic information present vs. absent) x 2 (white-collar vs. blue-collar crime) Analyses of Variance (ANOVAs) were conducted for all continuous dependent variables to investigate the first set of hypotheses regarding genetic evidence. Chi-square analyses were used for categorical dependent variables. Independent samples t-tests were used to specifically investigate the difference between white-collar gene conditions and blue-collar gene conditions, to answer the second set of hypotheses regarding crime-type. Group differences from the PUGGs (section 2 and 3) and demographic factors were also analysed to determine whether these would be required as covariates in the analyses. Effect size interpretations for

partial eta-squared (η_{p2}) were: small = .01, medium = .06, large = .14, and cohen's d (*d*) were: small = 0.2, medium = 0.5, large = 0.8 (Cohen, 1988).

Results

Data Screening

In total, 251 people participated in this study. In the final analyses, 217 participants results were used due to incomplete surveys (*n* = 25) and failed comprehension checks (*n* = 9).

An analysis was conducted to test for outliers - extreme variables (regarded as being more than 3.29 standard deviations away from the mean) that have the potential to distort data (Tabachnick & Fidell, 2007). An inspection of the data indicated that there were a number of outliers that appeared to be problematic (in the dependent variables of jail years, perceptions of dangerousness, culpability, and crime seriousness). In accordance with Tabachnick and Fidell (2007), the raw scores for these outliers were changed to be one unit larger (or smaller) than the next most extreme score in the distribution. This rule was applied to all accumulative measures for consistency purposes. Nineteen outliers were changed under this rule.

One-way ANOVAs were conducted to determine whether there were any between-group differences in age and in general knowledge regarding genetic information (as measured through the PUGGS section 2 and 3). Results are presented in Table 2 and indicate no significant group differences for age or genetic knowledge in section 2 or 3 of PUGGS. Chi-square analyses indicated no significant group differences for gender nor ethnicity (Table 2). These variables were therefore not used as covariates in the analyses.

Table 2

Between Group Differences on Demographic and Genetic Knowledge Factors

		Blue-Collar x Genetic (*n* = 51)	Blue-Collar x Nongenetic (*n* = 57)	White-Collar x Genetic (*n* = 65)	White-Collar x Nongenetic (*n* = 44)	*F*/ χ^2	*p*	η^2/V
Age	Mean (SD)	33.92 (16.29)	31.16 (14.05)	31.74 (14.13)	28.02 (11.31)	1.39	.246	.019
Ethnicity	Caucasian	44	53	61	38	8.53	.482	.114
	Aboriginal/Torres	1	2	0	1			
	Asian	4	2	4	3			
	Other	2	0	0	2			
Gender	Female	34	41	45	28	3.97	.681	.096
	Male	17	15	20	16			
	Prefer not to say	0	1	0	0			
PUGGS 2	Mean (SD)	50.06 (4.87)	49.98 (6.22)	50.32 (4.64)	50.49 (4.89)	.098	.961	.001
PUGGS 3	Mean (SD)	5.37 (2.64)	5.17 (2.52)	5.25 (2.79)	5.45 (2.72)	.112	.953	.002

Results

Multiple 2 x 2 ANOVAs were conducted through SPSS to investigate group differences (crime-type and genetic evidence) on perceptions of culpability, dangerousness, and sentence severity. These results were to respond specifically for gene-related hypotheses. Independent samples t-tests were ran to determine the difference between two specific groups: Blue-collar genetic and white-collar genetic conditions. These were used specifically for crime-type related hypotheses. Descriptive data for gene condition and crime condition are presented in Tables 3 and 4 below. Further analyses were also conducted however these were not reported due to not directly address this study's hypotheses (see Appendix J for all SPSS outputs).

Table 3

Descriptive Statistics for Genetic and Nongenetic Conditions

DV Ratings	Genetic Information (*n* = 116)		No Genetic Information (*n* = 101)	
	M (SE)	95% CI	M (SE)	95% CI
Culpability	14.86 (.163)	[14.54, 15.18]	15.84 (.175)*	[15.49, 16.18]
Dangerousness	8.66 (.245)	[8.17, 9.14]	7.93 (.263)*	[7.41, 8.45]
Jail years (SS)	3.09 (.274)	[2.55, 3.63]	4.14 (.293)*	[3.56, 4.72]
Impulsive nature (SS)	2.50 (.109)	[2.29, 2.72]	1.89 (.117)*	[1.66, 2.12]
Rehabilitation (SS)	4.11 (.086)	[3.94, 4.28]	4.06 (.092)	[3.88, 4.24]
Average sentence (SS)	2.50 (.09)	[2.33, 2.68]	2.86 (.096)*	[2.67, 3.05]
Sympathy	3.14 (.109)	[2.93, 3.36]	2.23 (.117)*	[2.00, 2.46]

Note: CI = Confidence interval; SS = Sentence severity

* indicates a significant difference between this value and the first mean

Table 4

Descriptive Statistics for Blue-Collar and White-Collar Conditions

DV Ratings	Blue-Collar (*n* = 108)		White-Collar (*n* = 109)	
	M (SE)	95% CI	M (SE)	95% CI
Culpability	15.02 (.168)	[14.69, 15.35]	15.68 (.170)*	[15.34, 16.01]
Dangerousness	9.57 (.252)	[9.08, 10.07]	7.01 (.256)*	[6.51, 7.52]
Jail years (SS)	3.21 (.282)	[2.65, 3.77]	4.02 (.285)*	[3.46, 4.58]
Impulsive nature (SS)	2.08 (.112)	[1.86, 2.29]	2.31 (.114)	[2.09, 2.54]
Rehabilitation (SS)	4.10 (.088)	[3.93, 4.27]	4.07 (.090)	[3.89, 4.25]
Average sentence (SS)	2.71 (.093)	[2.53, 2.89]	2.66 (.094)	[2.47, 2.84]
Crime seriousness	7.54 (.171)	[7.20, 7.88]	7.17 (.173)	[6.83, 7.51]
Sympathy	2.69 (.113)	[2.47, 2.91]	2.69 (.114)	[2.46, 2.91]

Note: CI = Confidence interval; SS = Sentence severity

* indicates a significant difference between this value and the first mean

Perceptions of Culpability

A 2 x 2 ANOVA was conducted to investigate whether genetic evidence or crime-type had an influence on perceptions of culpability (see Tables 3 and 4 for descriptive statistics). The Levene's test was significant, indicating that caution should be used when interpreting results, even though ANOVA is relatively robust to breaches of assumptions (Field, 2013). There was a significant main effect for genetic evidence, $F(1, 213) = 16.73$, $p < .001$, $\eta_{p2} = .073$, which is considered a medium effect. This result suggests that the defendant was perceived to be less culpable for the crime when presented alongside genetic evidence compared to no genetic evidence. There was also a significant main effect for crime-type, $F(1, 213) = 7.52$, $p = .007$, $\eta_{p2} = .034$, which is a small-medium effect. This shows that, overall, white-collar crime resulted in significantly higher culpability ratings than blue-collar crime (see Figure 1). There was no evidence for an interaction effect between genetic evidence and crime-type.

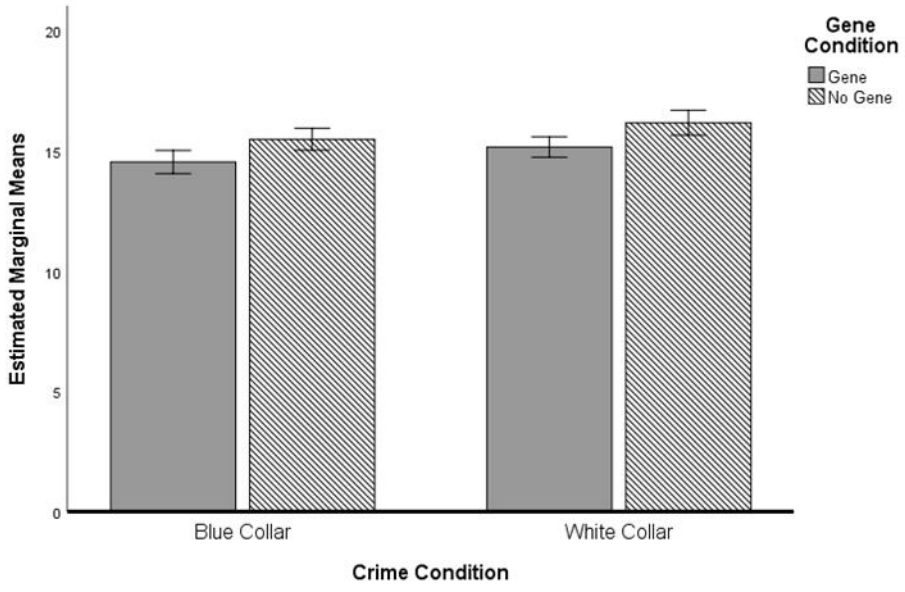

Figure 1. Bar graph of gene and crime-type conditions for culpability (error bars: 95% CI)

An independent samples t-test was also conducted to examine specifically whether the presence of the gene provided different culpability ratings between blue-collar or white-collar crime. With equal variances assumed, it was nonsignificant, $t(114) = -1.66$, $p = .099$, $d = 0.31$, demonstrating that there were no significant differences on genetic evidence influence between crime-types.

Perceptions of Dangerousness

A 2 x 2 ANOVA was conducted to investigate whether genetic evidence or crime-type had an influence on perceptions of dangerousness (see Tables 3 and 4 for descriptive statistics). The Levene's test was nonsignificant, so the assumption of homogeneity was not violated. There was a significant main effect for genetic evidence, $F(1, 213) = 4.11$, $p = .044$, $\eta_{p2} = .019$, which is considered a small effect. This shows that genetic evidence resulted in higher dangerousness perceptions than no genetic evidence. There was also a significant main effect for crime-type, $F(1, 213) = 40.90$, $p < .001$, $\eta_{p2} = .193$, which is considered a large effect. This demonstrates that blue-collar crime conditions resulted in higher dangerousness perceptions than white-collar crime. There was no evidence of an interaction.

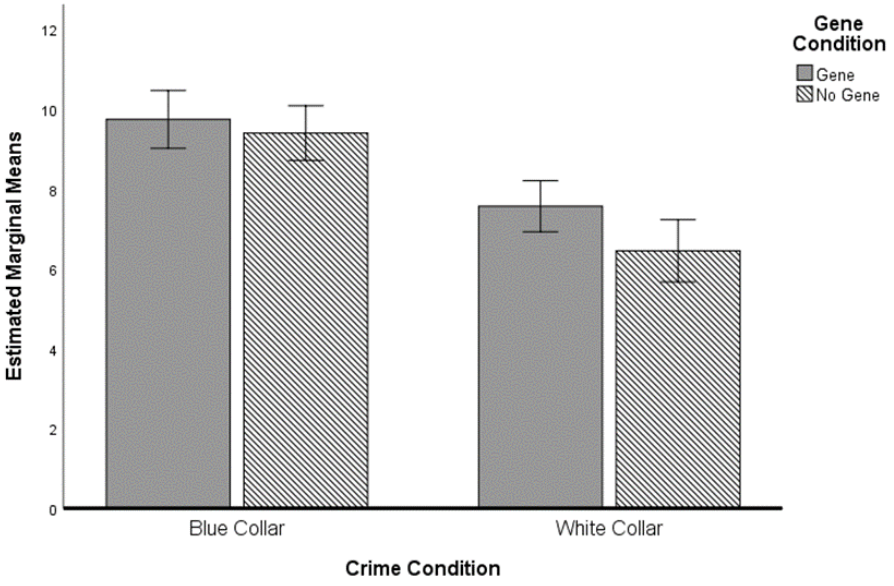

Figure 2. Bar graph of gene and crime-type conditions for dangerousness (error bars: 95% CI)

Sympathy levels were compared in a 2 x 2 ANOVA between groups to determine whether there was an influence of crime-type or genetic information on ratings of sympathy. The Levene's test was significant, suggesting that caution should be used when interpreting these results. There was a significant main effect for genetic information, $F(1, 213) = 32.21$, $p < .001$, $\eta_{p2} = .131$, which is a medium-large effect, demonstrating that genetic evidence generated more sympathy than no genetic evidence. There was no significant main effect for crime-type, nor an interaction.

An independent samples t-test was conducted to specifically test whether blue-collar gene and white-collar gene conditions differed. With equal variances assumed, the t-test was significant, $t(114) = 4.46$, $p < .001$, $d = 0.50$ (a medium effect), demonstrating that blue-collar genetic conditions ($M = 9.75$, $SD = 2.71$) resulted in higher dangerousness perceptions than white-collar genetic conditions ($M = 7.57$, $SD = 2.52$).

Sentence Severity Judgments

A chi-square analysis demonstrated that there was a significant difference between genetic and nongenetic conditions on punishment type (Table 5). Whilst imprisonment was determined to be appropriate by the majority in both conditions (53% for gene, 72.3% for no gene), a good behaviour bond or fine was considered more so in the genetic condition (30% and 17%) than nongenetic condition (19.8% and 7.9%). There was no significant differences between crime-types on punishment type, with majority suggesting imprisonment is the most appropriate (Table 6).

Table 5

Chi-Square for Punishment Type for Genetic and Nongenetic Conditions

Punishment Type	Genetic Information (n = 116)	No genetic Information (n = 101)	χ^2	p	V
Good behaviour bond	35 (30%)	20 (19.8%)	9.32	.009*	.207
Fine	20 (17%)	8 (7.9%)			
Imprisonment	61 (53%)	73 (72.3%)			
None	0	0			

* indicates a significant result

Table 6

Chi-Square for Punishment Type for Blue-Collar and White-Collar Conditions

Punishment Type	Blue-Collar (n = 108)	White-Collar (n = 109)	χ^2	p	V
Good behaviour bond	32 (29.6%)	23 (21.1%)	5.04	.08	.152
Fine	9 (8.3%)	19 (17.4%)			
Imprisonment	67 (62.1%)	67 (61.5%)			
None	0	0			

A 2 x 2 ANOVA was conducted to investigate whether there was a difference between crime-types on 'how serious a crime is assault/fraud' (see Table 4 for descriptive statistics). There were no significant differences, meaning that participants found both types of crimes to be around the same level of seriousness (about seven out of ten). Multiple 2 x 2 ANOVAs were conducted to investigate whether genetic evidence or crime-type had an influence on various sentence severity items (see Tables 3 and 4 for descriptive statistics). In terms of jail years, the Levene's test was significant, so caution should be taken in interpretation of the results. There was a significant main effect for genetic evidence for jail length, $F(1, 213) = 6.86$, $p = .009$, $\eta_{p2} = .031$ (a small-medium effect). In particular, participants presented with genetic evidence gave an average of a 3-year sentence, compared to those presented with no genetic evidence, who averaged a 4-year sentence. There was also a significant main effect for crime-type, $F(1, 213) = 4.06$, $p = .045$, $\eta_{p2} = .019$ (small effect). Specifically, on average, participants in the blue-collar condition gave a recommendation of a 3-year sentence, compared to white-collar crime which averaged a 4-year sentence. There was no significant interaction effect.

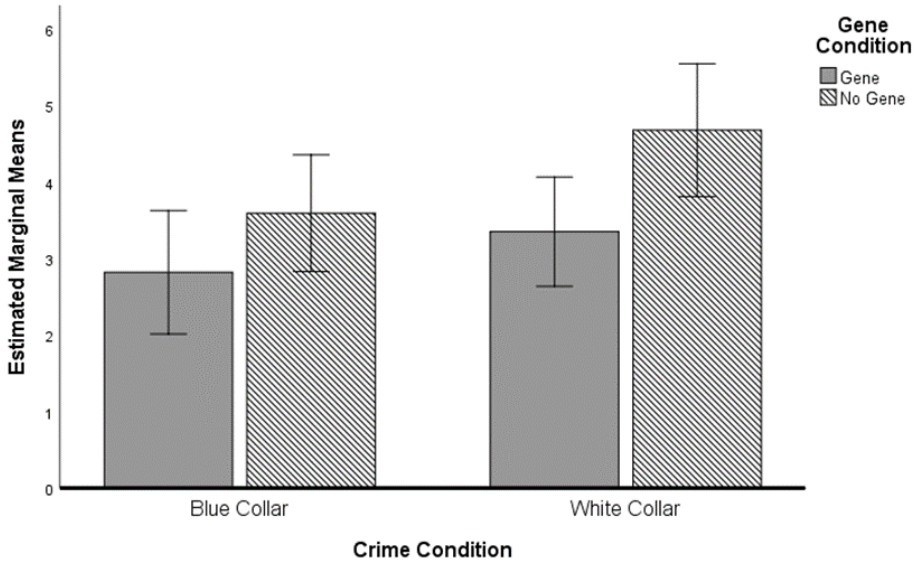

Figure 3. Bar graph for gene and crime-type conditions for jail years (error bars: 95% CI)

In terms of whether the defendant's sentence should be shorter or longer than the average length of four years, there was a significant main effect for genetic information, $F(1, 213) = 7.23$, $p = .008$, $\eta_{p2} = .033$ (a small effect), with genetic conditions suggesting that the sentence should be shorter than average. There was no significant main effect for crime-type nor an interaction.

There was a main effect for genetic information on '*Michael should be punished less harshly because of the impulsive nature of the crime'*, $F(1, 213) = p < .001$, $\eta_{p2} = .065$ (a medium effect) with participants in genetic conditions agreeing with this statement more strongly than nongenetic conditions. There was no main effect for this on crime-type or interaction. For '*Michael is capable of rehabilitation'*, no significant effects were found for crime-type or genetic conditions.

An independent samples t-test was conducted to specifically test whether blue-collar gene and white-collar gene conditions differed in lengths of imprisonment years. With equal variances assumed, the t-test was nonsignificant, $t(114) = -1.08$, $p = .283$, $d = 0.20$, demonstrating no significant differences between the two conditions.

Discussion

The present study investigated how genetic evidence influenced mock juror decision making on perceptions of a defendant, and whether this effect differed between crime-types. Presentation of the MAOA-L gene alongside a defendant's case increased perceptions of dangerousness, but also reduced perceptions of culpability and sentence severity. This supports the first two hypotheses (the defendant will be perceived as less culpable and more dangerous when a genetic explanation is presented) but not the third (more severe sentencing will be

recommended when a genetic explanation is presented). In terms of the interaction between genetic information and crime-type, participants perceived the defendant with the gene as more dangerous when it was a blue-collar crime compared to a white-collar crime, but no differences were found for perceptions of culpability or sentence severity. This supports the fifth hypothesis (presence of genetic information will result in higher dangerousness in blue-collar than white-collar crime) but not the fourth or sixth (presence of the genetic information will result in higher culpability ratings and more severe sentences in blue-collar crime than white-collar crime).

Genetic Evidence on Perceptions of the Defendant and Sentence Severity Judgements

The hypothesis that perceptions of culpability would be reduced when genetic evidence was supported, suggesting that mock jurors believed that possession of the MAOA-L gene was sufficient enough to reduce control of the defendant's actions. When genetic evidence was not introduced, the defendant was seen as being more culpable for his actions. Other studies similarly found that genetic information reduced perceptions of culpability and legal responsibility of the defendant, while at the same time finding either no effect on sentence length (Appelbaum & Scurich, 2014; Appelbaum et al., 2015; Fuss et al., 2015) or that sentence length was increased (Lui et al., 2019). Our findings demonstrated that sentence length was decreased by inclusion of genetic information. One explanation of a mitigating effect being discovered compared to other studies may be due to crime-type. As Denno's (2011) analysis found, genetic evidence was sometimes not considered to be strong enough to outweigh the aggravating evidence when crimes were particularly violent (e.g. murder). It may be that because this study looked at relatively mild crimes (fraud and assault), there was not enough aggravating evidence to overweigh the

mitigating evidence. Hence, this may be why a mitigated sentence was found contrasting to previous studies (e.g., Appelbaum et al., 2015).

Sentencing decisions were hypothesised to result in harsher sentences for genetic evidence compared to no genetic evidence. The majority of participants across all conditions thought imprisonment to be the most appropriate form of punishment, however a good behaviour bond or fine was considered by more people when a genetic explanation was presented compared to no additional evidence (Table 5). This suggests that when presented with genetic evidence, people may be more open to looking at alternatives to imprisonment. For example, in Fuss et al.'s (2015) study, judges were more likely to suggest a rehabilitative program for defendants with the gene, than to suggest imprisonment. It is possible that the mock jurors in this study may have felt the same way. While views regarding rehabilitation was investigated, no significance was found. This is possibly because rehabilitation was only measured on one question on a 5-point Likert scale and so perhaps there was insuffient variance to differentiate between opinions. Further studies that focus more on perceptions of rehabilitation, using more sensitive measures, would further understanding in this area.

In terms of imprisonment sentences, mock jurors who received genetic evidence indicated that the defendant should be punished less harshly due to the impulsive nature of the crime, more so than those who did not receive genetic evidence. In other words, the presentation of genetic evidence was influential in mitigating the sentence because of its impulsive nature. When mock jurors were asked to provide an estimated jail sentence length, those who were presented with genetic evidence suggested lesser sentences (approx. three years imprisonment) compared to no genetic evidence (approx. four years imprisonment). This has been

found in previous studies (e.g., Aspinwall et al., 2012), but was in contrast to the hypothesis that genetic information would aggravate sentence length. This may be because mock jurors valued the loss of control (caused by the gene) important enough to reduce the blame on the defendant and thus reduce the sentence severity.

It is interesting to note that in both this study and Aspinwall et al.'s (2012) study, the difference in sentencing suggestions was approximately one year. While this could be considered a substantial difference, it also demonstrates that the possession of the gene cannot, and does not, excuse a defendant from full criminal responsibility in the views of the participants (McSwiggan et al., 2017). The genetic evidence therefore only has a limited mitigating effect, which could potentially be perceived as a weak form of evidence for defence lawyers. Nevertheless, these results demonstrate that genetic evidence could indeed be presented in court as a form of mitigating evidence.

The combined result of reduced culpability and reduced sentence severity aligns with the theory of dyadic morality, which suggests that victims are seen as less blameworthy for a crime (Gray & Wegner, 2011). In this scenario, Michael may be seen as a victim because he endured childhood abuse. Results indicated that participants viewed the defendant with more sympathy when presented with genetic information compared to no genetic information. This finding tends to support the theory – as feelings of sympathy may have increased the likelihood of seeing Michael as a victim. In other words, according to the theory, it may not be the information about the gene that results in mitigated sentences, but the information about the childhood abuse, which led to ideologies of victimhood, resulting in less severe sentences.

The defendant was also perceived to be more dangerous when equipped with the MAOA-L gene, compared to no gene. This effect has been found in previous studies (Appelbaum & Scurich, 2014; Costa et al., 2017). Considering perceptions of culpability were also reduced, the heightened perceived dangerousness may be due to ideas of the MAOA-L gene leading to a lack of control, meaning that the defendant could lash out unpredictably at any time (Berryessa, 2014). Nevertheless, it is clear that despite the defendant being perceived as more dangerous, the influence of the gene had a substantial impact that was enough to reduce perceptions of culpability and ultimately result in a reduced jail sentence.

The findings demonstrate that the MAOA-L has mitigating properties which can be influential in a courtroom trial. Mock jurors considered the genetic evidence to be influential enough to reduce perceptions of culpability and sentence length. This has implications for defence lawyers, of whom can build their case to demonstrate that their defendant had little control over their actions due to possession of a gene that cannot be regulated. Like previous cases (e.g., *State v. Waldroup*), the presentation of this gene as a form of evidence can result in mitigated sentences, which could lead to reduced jail time or even avoid capital punishment (e.g., in U.S. trials).

The Influence of Genetic Evidence in Different Types of Crime

This study also aimed to investigate the differences between crime-types on genetic evidence influence. Genetic influence on perceptions of defendant culpability and sentence severity did not differ between the blue-collar crime and white-collar crime conditions. This did not support the hypotheses that genetic evidence would result in more severe sentences and higher levels of culpability for blue-collar crime compared to white-collar crime. Scurich and Appelbaum (2015) similarly found no

differences on genetic explanation effectiveness between crime-type (i.e., an assault, damage to property, and misbehaving 8-year old). While Scurich and Appelbaum did not directly look at blue-collar and white-collar crime differences, their crime-types were similar to the present study's in that there was a violent (assault) compared to a non-violent (misbehaving 8-year old) scenario.

The present study's resulted indicated that culpability did not differ between crime-types. This is in contrast to Robbin and Litton's (2018) study, which also investigated crime-type differences (robbery and homicide), but found that perceptions of blameworthiness (i.e., culpability) increased for homicide compared to robbery. It is possible this difference is because the present study's crime vignettes involved reactive aggression (i.e., a spur of the moment frustration), instead of instrumental aggression (i.e., a carefully planned aggression) as used by Robbin and Litton. As discussed by Levitt and Manson (2007), the aggression produced by the gene is the result of impulsivity rather than something carefully planned. Therefore, it is likely that the difference between our results and Robbins and Litton's results, is due to their study having an instrumental aggressive crime (robbery) and a reaction aggressive crime (homicide).

The present study found that the defendant (paired with the gene) who committed a blue-collar crime resulted in higher levels of perceived dangerousness than the white-collar criminal. This was expected and supported the hypothesis that mock jurors presented with genetic information would perceive the defendant as more dangerous in the blue-collar rather than white-collar condition. This may simply be the result of the crime being of a violent nature, compared to fraud which was not of a violent nature. Indeed, while the possession of the gene may be enough to for the criminal to be perceived as highly dangerous (as demonstrated through the

difference between white-collar gene and white-collar control differences, Figure 2), it appears more likely that crime of a violent (or even, physical) nature will elicit more fear than crime of a nonviolent (or nonphysical) nature.

The focal concerns theory suggests that sentencing decisions are influenced by perceptions of blameworthiness (i.e., culpability), protection of the community (i.e., dangerousness), and practical constrains (e.g., costs; Steffensmeier et al., 2006). The theory also posits that extralegal factors (e.g., age, race) use ideas of stereotypes (e.g., a white defendant committing a white-collar crime) to influence the perception of these features (Steffensmeier et al., 2017). While this study did not investigate practical constraints, it looked at whether the extralegal factor of possessing the MAOA gene influenced perceptions of blameworthiness and protection of community, and whether this influenced sentencing decisions. It was assumed that possession of the MAOA-L gene was stereotypical of a blue-collar crime, thus this crime-type would be perceived more negatively than the nonstereotypical pairing of the gene with a white-collar crime. While it was found that dangerousness (i.e., protection of the community) was influenced by the gene (i.e., extralegal factor), results were not found for either culpability (blameworthiness) nor sentence severity. Hence, our findings could not be sufficiently explained by the focal concerns theory.

The results suggest that crime-type may not influence how genetic information is interpreted by mock jurors. While the focal concerns theory suggests that stereotypical information can lead to increased sentence severity (Cassidy & Gibbs, 2019), this effect was not detected in this sample. Furthermore, no effect was detected for difference between perceptions of crime seriousness, suggesting that white-collar crime may not be seen as any less serious than blue-collar crime (compared to Michel, 2016 and Rossi et al., 1974's findings). As such, it cannot be

established whether the use of the MAOA-L gene would be more influential in a blue-collar crime case or a white-collar crime case. This limits the implications of recommendations that could be provided to defence lawyers. Despite these findings, this study is, to the best of the author's knowledge, the only one of its kind to investigate the difference of genetic evidence perceptions between blue-collar crime and white-collar crime.

Strengths, Limitations and Future Directions

The present study had a wide range of participants (i.e., age range; not just university students), which allowed an adequate representation of the diverse range of community members, strengthening external validity for the characteristics of a juror. Our sample was unique in that it was an entirely Australian sample, something that has been lacking in this field of research and is an area requiring further investigation. Considering this form of evidence is majorly used in capital trials, and the death penalty is not used in Australia, it is unclear if or when this specific form of evidence would realistically occur in Australian trials. Further knowledge and analysis of the use of the MAOA-L gene in Australian court trials is therefore required. Our results differed between German (Fuss et al., 2015) and U.S. (e.g., Appelbaum et al., 2015) populations, suggesting that Australian populations may perceive this form of evidence differently. In saying this, it is important to note that this population was also majorly Tasmanian, which may, again, prove differences between other parts of Australia and different jurisdictions. From an initial interpretation, it may be that different countries (or states) possess different internal values or views about what appropriate punishment is. Future research should investigate more diverse Australian populations as well as reasons as to why cultural

differences may exist. Investigating juror attributes and internal beliefs may also be beneficial in this comparison.

To the best of the author's knowledge, this study is the only one of its kind to compare the effects of genetic evidence between white-collar and blue-collar crime, and to implement the focal concerns theory in terms of evaluating genetic evidence perceptions. Moreover, participants considered both types of crime vignettes to be approximately the same level of seriousness (see Table 4). This strengthens findings because it indicates that the variation in results are likely due to the intended condition and genetic manipulations rather than other factors.

While the focal concerns theory did not appear to explain our findings, future studies may investigate this further, potentially by directly assessing mock juror perceptions of the three aspects of focal concerns (blameworthiness, protection of community, practical constraints), or different forms of crime (e.g., a crime that cannot be explained by an extralegal factor compared to one that can). Considering that the MAOA-L gene influences not only aggression, but impulsivity, it may be beneficial to compare two nonviolent crimes, as the violent and nonviolent comparison may have influenced results. This study also addressed potential limitations and confounds from other studies by avoiding the use of injuries, brain imaging, and mental illness. By presenting a brief explanation of genetic evidence, we can be sure that participants are only influenced by information regarding the gene.

There are a number of limitations in this study. The ecological validity of this study was reduced due to the online nature of the vignettes and questionnaire. The atmosphere and emotions within a courtroom trial are much different to a computer screen. It is indeed possible that oral presentations of the genetic information may be

more (or less) convincing than a written presentation (Appelbaum et al., 2015). Furthermore, the vignettes themselves have the capacity to influence results just through wording, length, and complexity, which should be kept in consideration (Appelbaum & Scurich, 2014). While research has suggested that the use of online studies produces high validity (Gosling, Vazire, Srivastava, & John, 2004), it is still a possibility that participants may not understand information or give honest ratings. The comprehension check in our survey was implemented to minimise this concern.

It is possible that our results were influenced by reactions to the defendant's childhood abuse, rather than his genetic predisposition. As Robbins and Litton (2018) found, childhood abuse was the most influential aspect in their findings of reduced culpability, as it emphasised the perception of the defendant as a victim. Further research should be conducted with genetic evidence separate to childhood trauma to determine whether this effect still stands. Furthermore, since our results support the theory of dyadic morality, future research should focus on this theory, such as exploring whether jurors do indeed perceive the defendant as a victim.

It is also important to consider that jurors are typically not involved in sentencing decisions. Nevertheless, the results found in this study do demonstrate that if this form of evidence was to be used (in any stage of a trial), it would help in building a sympathetic view of the defendant that could potentially lead to a reduced sentence.

Implications and Conclusion

This study demonstrates that genetic evidence has the potential to result in mitigated sentences. Reduced culpability and heightened sympathy appeared to be influential factors that outweighed the increased perception of dangerousness. This highlights the double-edged sword nature of genetic evidence (Aspinwall et al.,

2012), but in this study, mitigating circumstances outweighed aggravating. The findings indicate some support for the theory of dyadic morality, however the influence of childhood trauma may an underlying factor. The results indicated by differences in crime-type showed that genetic evidence provided no significant differences between blue-collar or white-collar crimes, except for perceptions of dangerousness. This suggests that the focal concerns theory may not be applicable to these results, and furthermore suggests that genetic evidence may be perceived equally despite type of crime. Whilst these are preliminary findings, and further research should be conducted for crime-type differences, genetic evidence may be a form of mitigating evidence that can be used across a wide range of case scenarios. This has implications for the criminal justice system, in that genetic evidence can be invaluable for lawyers and other legal authorities when considering a defendant's case, as it can result in reduced perceptions of culpability and lead to lesser sentences. While there are no guarantees that introducing genetic evidence of the presence of the MAOA-L gene will mitigate the defendant's sentence, this study has shown that the general public are likely to be influenced by the evidence.

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Appendix A

Ethics Approval

UNIVERSITY of TASMANIA

28 May 2019

Dr Christine Padgett
C/- University of Tasmania

Sent via email

Dear Dr Padgett

REF NO: H0018144
TITLE: The Effects of Defendant and Juror Attributes in Legal Settings

We are pleased to advise that acting on a mandate from the Tasmania Social Sciences HREC, the Chair of the committee considered and approved the above project on 28 May 2019.

Please ensure that all investigators involved with this project have cited the approved versions of the documents listed within this letter and use only these versions in conducting this research project.

This approval constitutes ethical clearance by the Tasmania Social Sciences HREC. The decision and authority to commence the associated research may be dependent on factors beyond the remit of the ethics review process. For example, your research may need ethics clearance from other organisations or review by your research governance coordinator or Head of Department. It is your responsibility to find out if the approvals of other bodies or authorities are required. It is recommended that the proposed research should not commence until you have satisfied these requirements.

In accordance with the National Statement on Ethical Conduct in Human Research, it is the responsibility of institutions and researchers to be aware of both general and specific legal requirements, wherever relevant. If researchers are uncertain they should seek legal advice to confirm that their proposed research is in compliant with the relevant laws. University of Tasmania researchers may seek legal advice from Legal Services at the University.

All committees operating under the Human Research Ethics Committee (Tasmania) Network are registered and required to comply with the *National Statement on the Ethical Conduct in Human Research* (NHMRC 2007 updated 2018).

Therefore, the Chief Investigator's responsibility is to ensure that:

(1) All investigators are aware of the terms of approval, and that the research is conducted in compliance with the HREC approved protocol or project description.

(2) Modifications to the protocol do not proceed until **approval** is obtained in writing from the HREC. This includes, but is not limited to, amendments that:

Human Research Ethics Committee (Tasmania) Network
Research Ethics and Integrity Unit
Office of Research Services
Private Bag 1
Hobart Tasmania
7001
Australia
T +61 3 6226 6254
E ss.ethics@utas.edu.au
ABN 30 764 374 782 /CRICOS 00586B
utas.edu.au

UNIVERSITY of TASMANIA

(i) are proposed or undertaken in order to eliminate immediate risks to participants;
(ii) may increase the risks to participants;
(iii) significantly affect the conduct of the research; or
(iv) involve changes to investigator involvement with the project.

Please note that all requests for changes to approved documents must include a version number and date when submitted for review by the HREC.

(3) Reports are provided to the HREC on the progress of the research and any safety reports or monitoring requirements as indicated in NHMRC guidance. Researchers should notify the HREC immediately of any serious or unexpected adverse effects on participants.

(4) The HREC is informed as soon as possible of any new safety information, from other published or unpublished research, that may have an impact on the continued ethical acceptability of the research or that may indicate the need for modification of the project.

(5) All research participants must be provided with the current Participant Information Sheet and Consent Form, unless otherwise approved by the Committee.

(6) This study has approval for four years contingent upon annual review. A *Progress Report* is to be provided on the anniversary date of your approval. Your first report is due 20 May 2020, and you will be sent a courtesy reminder closer to this due date. Ethical approval for this project will lapse if a Progress Report is not submitted in the time frame provided

(7) A *Final Report* and a copy of the published material, either in full or abstract, must be provided at the end of the project.

(8) The HREC is advised of any complaints received or ethical issues that arise during the course of the project.

(9) The HREC is advised promptly of the emergence of circumstances where a court, law enforcement agency or regulator seeks to compel the release of findings or results. Researchers must develop a strategy for addressing this and seek advice from the HREC.

Should you have any queries please do not hesitate to contact me on (03) 6226 6254 or via email ss.ethics@utas.edu.au.

Yours sincerely

Jude Vienna-Hallam
Executive Officer I Social Sciences

Appendix B

Participant Recruitment Flyer for On-Campus

How do people on juries make decisions?

THE EFFECTS OF DEFENDANT AND JUROR ATTRIBUTES IN LEGAL SETTINGS

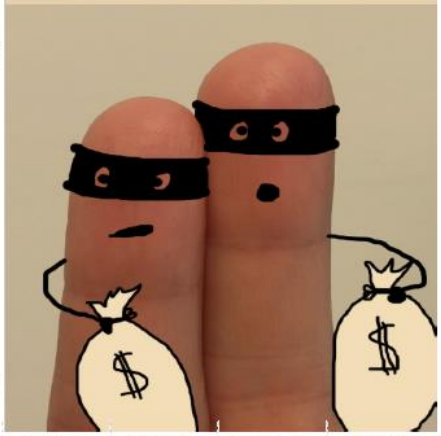
In this online study you'll be asked to assume the role of a juror, read a summary of a criminal court case, and answer some questions.
To be involved, go to the link:
<https://www.surveymonkey.com/r/F8CBJJH>

Or scan the QR code to take you to the survey. It should take approximately 45 minutes to complete. After completion of the survey you can go into the running to win one of 4 $50 gift vouchers, or first-year psychology students can earn 45 minutes research participation credit.

Scan me

UNIVERSITY of TASMANIA

Ethics approval number: H0018144
Any questions please contact Christine Padgett (Christine.padgett@utas.edu.au), Emma Smith (esmith11@utas.edu.au) or Bethany Muir (brmuir@utas.edu.au)



Please email Beth: brmuir@utas.edu.au for the survey link

Please email Emma: esmith11@utas.edu.au for the survey link

Please email Beth: brmuir@utas.edu.au for the survey link

Please email Emma: esmith11@utas.edu.au for the survey link

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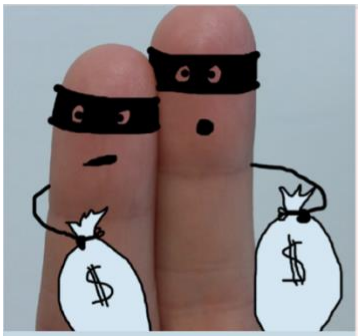
Please email Beth: brmuir@utas.edu.au for the survey link

Please email Beth: brmuir@utas.edu.au for the survey link

Appendix C

Participant Online Recruitment Advertisement



How do people on juries make decisions?

The Effects of Defendant and Juror Attributes in Legal Settings

In this online study you'll be asked to assume the role of a juror, read two summaries of criminal court cases, and answer some questions.

To be involved, go to the link: https://www.surveymonkey.com/r/F8CBJJH

It should take approximately 45 minutes to complete. After completion of the survey you can go into the running to win one of 4 $50 gift vouchers, or first-year psychology students can earn 45 minutes research participation credit

Any questions please contact Christine Padgett (Christine.Padgett@utas.edu.au) or Bethany Muir (brmuir@utas.edu.au) or Emma Smith (esmith11@utas.edu.au)

Ethics Approval number: H0018144

Appendix D

Demographic Information

Please answer the following questions about yourself.

1. Age (Chosen from drop-down menu in Survey Monkey from 18 – 75+)
2. Gender
    - Female
    - Male
    - Prefer not to say
    - Other
3. Ethnicity
    - Caucasian/White
    - Aboriginal/Torres Strait Islander
    - Asian
    - Other (please specify)

Are you currently enrolled in, or have previously been enrolled in, any of the following?

KHA106 – Brain, Mind and Emotion or PSY112 Brain and Behaviour

Any university level law units

Any university level neuroscience units

Appendix E

Vignettes

White-Collar Vignette:
Michael is a 35-year-old male being charged with financial fraud.

Michael has been working as a corporate bank teller for the past 10 years. On October 15th, 2018, he was told by his manager that his application for promotion had been turned down. Much to Michael's annoyance and dismay, his least favourite co-worker Steve was the recipient of the promotion, despite being less experienced than Michael. When Steve's promotion was announced to the office, everyone went and congratulated Steve. Michael started shaking with anger. In a fit of rage, he transferred over a million dollars from several large company accounts into his own bank account, and also took money out of Steve's personal account. Two weeks later, an investigation traced back the missing funds to Michael, and he was arrested.

Michael has been charged with financial fraud, an offence of which usually incurs a 4-year jail sentence.

Blue-Collar Vignette:
Michael is a 35-year-old male being charged with assault.

On the evening of October 15th, 2018, Michael was walking to his car after work. As he approached his car, he noticed a parking officer writing him a ticket. He ran up to the officer and explained he was late due to a meeting at work. The parking officer, Steve, said he couldn't cancel the ticket, and stuck it to the windscreen of Michael's car. This made Michael instantly angry, and he began yelling at Steve, saying it wasn't his fault he was late. Steve attempted to walk away, but Michael grabbed him and punched him in the face. Steve was knocked unconscious and hit his head on the ground, and was later diagnosed with possibly long term brain damage.

Michael has been charged with common assault, an offence of which usually incurs a 4-year jail sentence.

Condition 1: White-collar control
No additional information provided

Condition 2: Blue-collar control
No additional information provided

Condition 3: White-collar + genetics
The following is added to the white collar vignette:

Michael's defence lawyer introduces evidence from a genetic test showing that Michael has a specific form of the MAOA gene (sometimes known as the ‘warrior’ gene), which can predispose people to being more impulsive. The lawyer also provides evidence that as a child, Michael was repeatedly severely abused by his father, often being beaten with a belt as discipline. The defence lawyer argues that because Michael possesses this version of the gene, and was exposed to childhood violence, it is difficult for him to be able to control his behaviour.

An expert witness testifies that individuals with this version of the MAOA gene have a high risk of impulsive and violent behaviour, if they also have a history of childhood abuse.

Condition 4: Blue-collar + genetics
Details are added to the blue collar vignette the same as for condition 3

Appendix F

Dependent Variable Questions

# = in genetic information conditions only
SD = Strongly disagree
SA = Strongly agree

Comprehension checks

- What is the crime Michael is charged with? [options: *assault conditions*: assault/attempted murder; *fraud condition* financial fraud/bank robbery]

Perceptions of Culpability

- Michael should be found guilty of this crime [1 = SD – 5 = SA]
- Michael was legally responsible for this crime [1 = SD – 5 = SA]
- Michael was in control of his actions [1 = SD – 5 = SA]
- The impulsive nature of the crime means Michael is less responsible for his actions [1 = SD – 5 = SA]
- The family violence Michael experienced as a child means he is less responsible for this crime [1 = SD – 5 = SA] #
- The fact that Michael has the version of the MAOA gene that is associated with impulsivity means he is less responsible [1 = SD – 5 = SA] #

Perceptions of Dangerousness

- I would be fearful of Michael if I met him [1 = SD – 5 = SA]
- Michael is a danger to society [1 = SD – 5 = SA]
- How likely do you think it is that Michael will engage in a similar criminal act in the future [1 = very unlikely – 5 = very likely]
- Because Michael has a type of gene associated with increased impulsivity, he is less in control of his actions [1 = SD – 5 = SA] #
- Possessing the MAOA gene means that Michael is more likely to be violent [1 = SD – 5 = SA] #
- Experiencing violence as a child means Michael is more likely to be violent as an adult [1 = SD – 5 = SA] #
- I feel sympathy for Michael [1 = SD – 5 = SA]

Sentence severity

- What punishment do you think Michael deserves? [participants were able to select one option]
    - None – he should not be found guilty of this crime
    - Good behaviour bond (so will stay free, but if he commits another crime within 24 months, a penalty for this crime will be also added)

- Fine (so will have to pay up to $2,800, but remain free)
- Imprisonment (will go to prison for a period of time)

- Using the dropdown tool, please indicate how many years you believe Michael should get imprisoned for [0-50+ years]
- On a scale of 1-10, how serious a crime do you think fraud/assault is?
- The average sentence for this crime is 4-year imprisonment. What sentence do you believe Michael should get? [1 = A lot shorter than average 5 = a lot longer than average]
- Michael should be punished less harshly because of the impulsive nature of the crime [1 = SD – 5 = SA]
- I believe Michael is capable of rehabilitation [1 = SD – 5 = SA]
- The information about the MAOA gene should be taken into account when Michael is sentenced [1 = SD – 5 = SA] #
- Given the information about the MAOA gene, Michael should be punished more harshly [1 = SD – 5 = SA] #
- Given the information about the MAOA gene, Michael's sentence should be reduced [1 = SD – 5 = SA] #
- Given the information about Michael's traumatic childhood, Michael should be punished more harshly [1 = SD – 5 = SA] #
- Given the information about Michael's traumatic childhood, Michael's sentence should be reduced [1 = SD – 5 = SA] †
- Is there any information Michael's lawyer could present that you believe would mitigate **(reduce)** his sentence? (list of options, tick all that apply)
    - Genetic predisposition to violence
    - Traumatic childhood background
    - A clean criminal record before this crime
    - Mental illness
    - Intellectual disability
    - Michael accepts responsibility and shows huge remorse for what he had done
    - He was going through a tough time at the time of the crime (e.g., death in the family)
    - Nothing would result in a more lenient sentence

Relevance of information

- The genetic information had an impact on my decision [1 = SD – 5 = SA] #
- The information about the childhood trauma had an impact on my decision [1 = SD – 5 = SA] #

Appendix G

Public Understanding and Attitudes towards Genetics and Genomics Scale (PUGGS) Section 2 and 3

Section 2: Belief in Genetic determinism

People vary in traits (physical features, behaviours, diseases and disorders), such as those shown in the table below. Genetic differences and environmental differences contribute to this variation. Environmental differences can for example be differences in culture, upbringing, lifestyle, eating habits, or exposure to pollution. In the table below please indicate to what extent you think genetic and environmental differences contribute to these traits.

For each of the traits below, please choose one of the options:

1= Only environmental differences contribute to the trait

2= Mainly environmental differences contribute to the trait

3= Both genetic and environmental differences contribute to the same extent to the trait

4= Mainly genetic differences contribute to the trait

5= Only genetic differences contribute to the trait

- Example: Eye colour
- Height
- Bipolar disorder
- Diabetes
- Colour blindness
- Schizophrenia
- Breast cancer
- Interest in fashion
- Addiction to gambling
- Political beliefs
- Intelligence in adults
- Severe depression
- Attention Deficit Hyperactivity Disorder (ADHD)
- Asthma
- Violent behaviour
- Religious beliefs
- Blood group (ABO)

Section 3: Knowledge about gene-environment interaction

Please read each statement below and choose one of the options (True, False or Don´t know). Please only choose “don’t know” if you do not understand the statement.

1. A gene codes directly for a trait or disease.
2. Most human traits and diseases are caused by a single gene.
3. A single gene can influence several different traits or diseases.
4. A person´s height is influenced by one gene only.
5. Most traits and diseases are influenced by many different genes.
6. Most traits and diseases are caused by environmental factors only (such as diet and lifestyle).
7. A gene can only influence a single trait or disease.
8. Most traits and diseases are caused by both genes and environmental factors.
9. A person´s height is influenced by many different genes.

Thankyou for completing our survey. If you would like to go in the draw to win a $50.00 Coles Group gift voucher, or if you are a first-year psychology student who wishes to receive research credit, you must follow this link https://www.surveymonkey.com/r/JM38LMG

Appendix H

Participant Information Sheet

The Effects of Defendant and Juror Attributes in Legal Settings
Participant Information Sheet

1. Invitation

You are invited to participate in a study examining the influence of juror and defendant characteristics on criminal trial outcomes. This study is being conducted as part of honours and masters research projects under the supervision of Dr Christine Padgett, from the School of Medicine (Psychology) at the University of Tasmania. Before you decide to participate in this research, it is essential that you are aware of why the research is being conducted, and what is required of your participation in this study. Please take the time to carefully read the information provided, and feel free to ask any questions if necessary.

2. What is the purpose of this study?

The purpose of this study is to explore the influence of offender and juror characteristics on criminal trial outcomes.

3. Why have I been invited to participate?

You are eligible to participate in this study because you're either an undergraduate UTAS student, or a member from the general population over the age of 18. Participation in this study is completely voluntary and there will be no consequence for individuals who do not wish to participate in this study.

4. What will I be asked to do?

This is an online study that will begin with you providing your informed consent. If you consent to participate, you will be asked to compete a brief demographics questionnaire, including questions about your age, gender and ethnicity. You will be then be asked to read two hypothetical trial scenarios that describes either a physical assault or fraud charge, and answer questions relating to the trial, as well as other questions relating to your own beliefs about human behaviour in general. Taking part in this survey will take approximately 30 minutes, and all data are anonymous.

5. Are there any possible benefits from participation in this study?

It is not anticipated that your involvement in this study will result in any direct benefits. However, the data collected from this research will provide further understanding of how offender and juror characteristics influence criminal sentencing decisions.

After completing this study, non-psychology undergraduates and members of the general public will have the opportunity to go into the draw to win a $50 Coles/Myer gift voucher. First year psychology undergraduates from UTAS will be provided with the choice to either enter the gift voucher draw or receive 30 minute research participation course credit via SONA for their involvement in this study.

6. Are there any possible risks from participation in this study?

There are no anticipated risks of participating in this study. However, as there is some description of violence. If you feel discomfort at any point during the study, please stop immediately. If needed, there are phone support services available such as Lifeline (13 11 14) or Beyond Blue (1300 224 636), and UTas students have access to UTas counselling services (http://www.utas.edu.au/students/shw/counselling).

7. What if I change my mind during or after the study?

Your involvement in this study is completely voluntary. While we would be pleased to have you participate in this study, we respect your right to decline. If you decide to discontinue participation at any time throughout this study, there will be no consequences and you may do so without specifying an explanation. Withdrawing consent to participate in this study will not affect your relationship with the University of Tasmania. All information will be managed in a confidential manner, and your name will not be affiliated with any publications of this research.

8. What will happen to the information when this study is over?

All data that is collected from this study will be safely secured and kept confidential. It will be securely saved on a password-protected server in the School of Psychology. In accordance with National Ethics standards, we would like to retain your anonymous (de-identified) data to also use in future related research projects. This data would not contain any identifying information about you.

9. How will the results of the study be published?

As this research is part of a study for honours and masters projects, the relevant findings will be reported in honours and masters theses, and may also be published in academic journals. No participants will be identified in this research publication. If you would like to receive a copy of the results of the research, please inform the investigators.

10. What if I have questions about this study?

If you have any questions or require further information regarding this study, please feel free to contact the research team involved:

- Dr Christine Padgett: Email: Christine.padgett@utas.edu.au or phone 6226 5718

This study has been approved by the Tasmanian Social Sciences Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study, please contact the Executive Officer of the HREC (Tasmania) Network on +61 3 6226 6254 or email human.ethics@utas.edu.au. The Executive Officer is the person nominated to receive complaints from research participants. Quote ethics number H0018144.

Thank you for taking the time to read this information sheet, and your interest in this study. This information sheet is for you to keep. If you do wish to take part within this study, you will be required to fill out an informed consent form online prior to taking part in the study. By submitting the consent form, this will indicate that you agree to participate in this study.

Appendix I

Participant Consent Form

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1. I agree to take part in the research study named above.
2. I have read and understood the Information Sheet for this study.
3. The nature and possible effects of the study have been explained to me.
4. I understand that this study involves taking part in an online survey, where I will be asked to read a description about a hypothetical criminal trial scenario, and that I will then answer a series of questions.
5. I understand that all research data will be securely stored on the University of Tasmania premises, and that my anonymous/de-identified data will be kept indefinitely and may be used in related research
6. Any questions that I have asked have been answered to my satisfaction.
7. I understand that the researcher(s) will maintain confidentiality and that any information I supply to the researcher(s) will be used only for the purposes of the research.
8. I understand that the results of the study will be published so that I cannot be identified as a participant.
9. I understand that my participation is voluntary and that I may withdraw at any time during the survey without any effect. I understand that I will not be able to withdraw my data after completing the survey as it has been collected anonymously. Please select your choice below. You may print a copy of this consent form for your records.

Clicking on the "Agree" button indicates that:

- You have read and understand the above information
- You voluntarily agree to participate
- You are 18 years of age or older

I agree

Appendix J

SPSS Output

Please refer to the data file for additional output.